

HOLCOMB FOUNDATION ENGINEERING CO., INC.

SOILS - BITUMINOUS - CONCRETE - INVESTIGATIONS AND TESTING

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April 13, 2001

Architecture and Design Group, P.C.
2331 Mulberry Street
Mt. Carmel, Illinois 62863

Attention: Mr. Tim Raibley

Re: Subsurface Exploration and Foundation Recommendations
Proposed New Building for Crossville Telephone Co.
Crossville, Illinois
HFE File H-01120

Dear Sir:

In accordance with your instructions, we have performed a subsurface exploration for the above referenced project. This project is to consist of construction of new building for Crossville Telephone Company in Crossville, Illinois.

On April 10, 2001, we drilled five soil borings at this site. The site is located near an abandoned railroad line at the intersection of Main and Graves Streets. The borings are located at this site on this site as indicated on the enclosed "Boring Location Diagram".

The soil borings were drilled employing 3.25" ID hollow stem augers advanced to a depth of fifteen feet below the existing ground line. During drilling operations the subsoils were sampled with a split barrel-sampling device in accordance with ASTM D 1586. The apparent ground water level in each borehole was also determined, if encountered.

In the laboratory, the soil samples were subjected to visual classifications and moisture content determinations. Unconfined compressive strength tests were performed on all cohesive soil samples. Results of all field and laboratory tests are summarized on the enclosed Boring Logs.

The subsurface profile at this site consists of three to twelve inches of topsoil and brick fill overlying three to six feet of brown mottled gray silty clay (CL classification) in Borings #1 through #3. In Borings #4 and #5, three feet of a shale fill was encountered below the brick fill. At six feet in depth, a brown mottled gray clayey silt (ML) overlies a brown silty clay that extends down to at least the bottom of the soil borings. Ground water was not encountered in any of these soil borings.

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The topsoil is a highly organic stratum. The grass roots and humus present in the soils may result in extremely high settlements when subjected to structural loadings. The fill soil with bricks is also unsuitable material for support of the proposed structure.

The upper silty clay soils are stiff, with unconfined compressive strengths ranging from 1.4 to 4.0 tons per square foot, averaging 2.6 tsf. Moisture contents vary from 12 to 31 percent, averaging 24 percent. These soils have a moderate to low settlement potential.

The shale appears to be material that was placed for fill at this location. The standard penetration test values range from 13 to 19 blows per foot, averaging 16 bpf. Moisture contents vary from 13 to 15 percent, averaging 14 percent. This shale is a dense fill material, and appears adequate for support of the proposed structure.

The clayey silt is a soft to firm stratum, with unconfined compressive strengths ranging from 0.6 to 1.5 tons per square foot, averaging 0.9 tsf. Moisture contents vary from 23 to 27 percent. The silt has a medium to high settlement potential.

The silty clay encountered below eleven feet in depth is stiff, with unconfined compressive strengths ranging from 0.9 to 1.2 tons per square foot, averaging 1.0 tsf. Moisture contents vary from 21 to 24 percent, averaging 22 percent. These soils have a low settlement potential.

Based upon the seismic zone maps provided by BOCA, this site has an effective peak velocity related acceleration (A_v) of 0.14, and an effective peak acceleration (A_s) of 0.13. The soils encountered in the borings have an S_1 site classification.

Mine maps available from the Illinois State Geological Survey indicate this site has not been undermined. Therefore, subsidence should not be a problem at this site.

Information provided by Architecture and Design Group, P.C. indicates the proposed building is to have plan dimensions of 46 by 54 feet. The structure will be configured as shown on the enclosed Boring Location Diagram. This will be a one-story building, with relatively light structural loadings. Isolated column loadings are estimated at less than 40 kips, with continuous wall footings of less than 3 kips per foot.

Prior to construction of the building, it is recommended the upper few inches of topsoil, bricks, and any fill with debris are stripped from areas below the building pad. The topsoil may be wasted off site, or used for fill in landscaping areas. The bricks and debris should be disposed of off site.

Upon completion of topsoil stripping, it is recommended the building pad be thoroughly proofrolled with a loaded tandem dump truck. Any areas that pump or rut may be undercut to stiff subsoils and replaced with a select fill soil, or disced and aerated to lower their moisture content. Fill soils should be placed in eight inch loose lifts, compacting each lift to a minimum of 95% of the maximum standard laboratory dry density as determined by ASTM Method of Test D-698. After the subgrade has been proofrolled, placement of soils to grade the building pad may be performed.

Fill soils to elevate the building pad should consist of low plastic silty clay, placed in maximum eight-inch loose lifts. It is recommended each lift be compacted to a minimum of 98% of the maximum standard laboratory dry density as determined by ASTM Method of Test D-698 below the proposed footing elevations, and 95% compaction above the footing elevations.

Due to the high silt content of the upper soils on this site, if at all possible, site grading should be performed during hot, dry weather when the upper soils are in a relatively dry condition. If site grading is performed when the subgrade is saturated, the soils will tend to pump and rut. Saturated soils may require an artificial drying agent such as hydrated lime for drying purposes to achieve the specified compaction.

Based upon results of the soil borings and laboratory tests, it is recommended the proposed structure be supported upon isolated column and continuous wall foundations. The footings may be dimensioned using a maximum allowable soil bearing capacity of up to 2000 pounds per square foot. For frost protection, exterior footings should be founded at a minimum depth of 2.5 feet below the final ground line. It is also recommended the footings have a minimum width of 24 inches to avoid a punching type failure of the foundations.

It is recommended all footing excavations be thoroughly probed with a static cone penetrometer during construction. Soils encountered with less than the required strength should be excavated and replaced with lean concrete or a well compacted crushed stone. Any free water should also be removed from the excavations prior to concrete placement. It is important these soils be excavated and replaced if the in-place strengths are less than the recommended bearing pressure.

Total settlements of a 40 kip column are estimated to vary from 0.2 to 0.6 inch, with differential settlements estimated at less than 0.5 inch. To minimize differential settlements, thorough probing and removal of any soft soils encountered in the excavations is extremely important.

The proposed concrete slab on grade may be designed using a modulus of subgrade reaction estimated at approximately 125 psi per inch. The subgrade beneath the slab should be properly compacted or proofrolled as recommended in this report. The concrete floor slab may be supported upon a four-inch layer of free draining granular material. Generally, Illinois Department of Transportation Specification CA-7 or CA-11 crushed limestone is used in

Southern Illinois for this purpose. This is to provide a capillary break and a uniform leveling course beneath the slab.

As is evident at this site, the upper silty soils are susceptible to loss of strength when saturated. Therefore, positive surface drainage is very important. The downspouts should be placed to drain runoff well away from the building pad area.

Pavement design is dependent upon achieving proper compaction of the upper subgrade soils on site, which should result in an Illinois Bearing Ratio of approximately 2.0. The soil subgrade and any fill soils should be compacted to a minimum of 95% of the maximum standard laboratory dry density as determined by ASTM D-698. Pavement designs for light duty pavements are based upon a traffic loading of 500 passenger cars per day. The heavy duty truck pavement designs are based upon the same number of passenger cars and two single unit trucks per day. Design recommendations for a twenty-year pavement life are as follows:

Automobile Pavement Design:

Type A Basecourse:	8.0" Crushed Limestone
Bituminous Concrete Binder:	1.5"
Bituminous Concrete Surface:	1.0"
or	
Portland Cement Concrete:	5.0"
Subbase Granular Material, Type A:	Not Necessary

Truck Pavement Design (Trash Truck Drive):

Type A Basecourse:	10.0" Crushed Limestone
Bituminous Concrete Binder:	2.0"
Bituminous Concrete Surface:	1.5"
or	
Portland Cement Concrete:	6.0"
Subbase Granular Material, Type A:	4.0"

In the vicinity of any dumpsters, it is recommended the pavement consist of Portland Cement Concrete due to the heavy point loadings of the dumpster wheels.

The Illinois Department of Transportation "Standard Specifications for Road and Bridge Construction" adopted on January 1, 1997 indicate the materials to be used in the following sections:

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Bituminous Concrete Surface and Binder (Class I)
Section 406 (Pages 222-245)

Portland Cement Concrete
Section 420 (Pages 255-277)

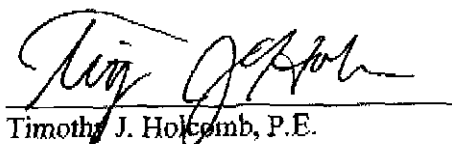
Crushed Stone Basecourse
Section 351 (Pages 170-173)

Subbase Granular Material, Type A
Section 311 (Pages 147-151)

Attached herewith are the Boring Location Diagram and Boring Logs. If you have any questions, please feel free to contact me at your convenience.

Sincerely,

HOLCOMB FOUNDATION ENGINEERING CO.


Timothy J. Holcomb, P.E.

